

OsRMC, a negative regulator of salt stress response in rice, is regulated by two AP2/ERF transcription factors

- [Tânia S. Serra](#),
- [Duarte D. Figueiredo](#),
- [André M. Cordeiro](#),
- [Diego M. Almeida](#),
- [Tiago Lourenço](#),
- [Isabel A. Abreu](#),
- [Alvaro Sebastián](#),
- [Lisete Fernandes](#),
- [Bruno Contreras-Moreira](#),
- [M. Margarida Oliveira](#),
- [Nelson J. M. Saibo](#)

Abstract

High salinity causes remarkable losses in rice productivity worldwide mainly because it inhibits growth and reduces grain yield. To cope with environmental changes, plants evolved several adaptive mechanisms, which involve the regulation of many stress-responsive genes. Among these, we have chosen *OsRMC* to study its transcriptional regulation in rice seedlings subjected to high salinity. Its transcription was highly induced by salt treatment and showed a stress-dose-dependent pattern. *OsRMC* encodes a receptor-like kinase described as a negative regulator of salt stress responses in rice. To investigate how *OsRMC* is regulated in response to high salinity, a salt-induced rice cDNA expression library was constructed and subsequently screened using the yeast one-hybrid system and the *OsRMC* promoter as bait. Thereby, two transcription factors (TFs), *OsEREBP1* and *OsEREBP2*, belonging to the AP2/ERF family were identified. Both TFs were shown to bind to the same GCC-like DNA motif in *OsRMC* promoter and to negatively regulate its gene expression. The identified TFs were characterized regarding their gene expression under different abiotic stress conditions. This study revealed that *OsEREBP1* transcript level is not significantly affected by salt, ABA or severe cold (5 °C) and is only slightly regulated by drought and moderate cold. On the other hand, the *OsEREBP2* transcript level increased after cold, ABA, drought and high salinity treatments, indicating that *OsEREBP2* may play a central role mediating the response to different abiotic stresses. Gene expression analysis in rice varieties with contrasting salt tolerance further suggests that *OsEREBP2* is involved in salt stress response in rice.

Title

OsRMC, a negative regulator of salt stress response in rice, is regulated by two AP2/ERF transcription factors

Journal

[Plant Molecular Biology](#)
[Volume 82, Issue 4-5 , pp 439-455](#)

Cover Date

2013-07-01

DOI

10.1007/s11103-013-0073-9

Print ISSN

0167-4412

Online ISSN

1573-5028

Publisher

Springer Netherlands

Additional Links

- [Register for Journal Updates](#)
- [Editorial Board](#)
- [About This Journal](#)
- [Manuscript Submission](#)

Topics

- [Plant Sciences](#)
- [Biochemistry, general](#)
- [Plant Pathology](#)

Keywords

- ABA
- Abiotic stress
- Adverse environmental conditions
- High salinity
- Cold
- Drought
- Transcriptional regulation
- EREBP
- Yeast one-hybrid
- Phosphorylation
- EMSA

Industry Sectors

- [Chemical Manufacturing](#)
- [Consumer Packaged Goods](#)

- [Energy, Utilities & Environment](#)

Authors

- [Tânia S. Serra](#) ^{(1) (2)}
- [Duarte D. Figueiredo](#) ^{(1) (2)}
- [André M. Cordeiro](#) ^{(1) (2)}
- [Diego M. Almeida](#) ^{(1) (2)}
- [Tiago Lourenço](#) ^{(1) (2)}
- [Isabel A. Abreu](#) ^{(1) (2)}
- [Alvaro Sebastián](#) ⁽³⁾
- [Lisete Fernandes](#) ^{(4) (5)}
- [Bruno Contreras-Moreira](#) ^{(3) (6)}
- [M. Margarida Oliveira](#) ^{(1) (2)}
- [Nelson J. M. Saibo](#)  ^{(1) (2)}

Author Affiliations

- 1. Genomics of Plant Stress Laboratory, Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa, Av. da Republica, 2780-157, Oeiras, Portugal
- 2. Instituto de Biologia Experimental e Tecnológica, Av. da Republica, 2780-157, Oeiras, Portugal
- 3. Laboratory of Computational Biology, Estación Experimental de Aula Dei/CSIC, Av. Montañana 1005, Zaragoza, Spain
- 4. Yeast Stress Laboratory, Instituto Gulbenkian de Ciência, Rua da Quinta Grande, 6, 2780-156, Oeiras, Portugal
- 5. Escola Superior de Tecnologia da Saúde de Lisboa, Instituto Politécnico de Lisboa, Av. D. João II, lote 4.69.01, 1900-096, Lisbon, Portugal
- 6. Fundación ARAID, Paseo María Agustín 36, Zaragoza, Spain